

CLAIMS

What is claimed is:

1. A method for making a neutralized aldehyde of lessened toxicity comprising the steps of:
 - c) providing an α -hydrogen-free aldehyde ; and
 - d) contacting the aldehyde with an effective amount of a base to render the treated aldehyde as neutralized and less toxic compared with the untreated aldehyde.
2. The method of claim 1 wherein the aldehyde comprises aldehydes selected from the group consisting of *o*-phthalaldehyde, formaldehyde and mixtures thereof.
3. The method of claim 1, wherein the base comprises at least one hydroxide group.
4. The method of claim 3, wherein the base is selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, lithium hydroxide, magnesium hydroxide, ferric hydroxide, aluminum hydroxide and mixtures thereof.
5. The method of claim 3, wherein the at least one hydroxide group is produced from a chemical reaction.
6. The method of claim 5, wherein the chemical reaction includes at least one chemical reacts with water, wherein the at least one chemical is selected from the group consisting of metallic lithium, metallic sodium, metallic potassium, metallic magnesium, metallic calcium, sodium hydride, potassium hydride,

magnesium hydride, calcium hydride, lithium hydride, sodium methoxide, sodium ethoxide, potassium methoxide, potassium ethoxide and mixtures thereof.

7. The method of claim 3, wherein the base is sodium hydroxide.
8. The method of claim 7, wherein the molar ratio of sodium hydroxide to *o*-phthalaldehyde is at least about 2.4:1.
9. The method of claim 1, wherein said the treated aldehyde has a pH, and the method further comprising adjusting the pH of the treated aldehyde.
10. The method of claim 9, wherein the pH of the treated aldehyde is adjusted by adding an acid.
11. The method of claim 10, wherein the acid is an organic acid or an inorganic acid.
12. The method of claim 11, wherein the organic acid is selected from the group consisting of amino acids, formic acid, acetic acid, propionic acid, butyric acid, benzoic acid, and mixtures thereof.
13. The method of claim 11 wherein the inorganic acid is selected from the group consisting of hydrochloric acid, sulfuric acid, phosphoric acid, potassium dihydrogen phosphate, nitric acid and mixtures thereof.
14. The method of claim 9, wherein the pH of the treated aldehyde is adjusted by a buffer.
15. The method of claim 9, wherein the pH of the treated aldehyde is adjusted by adding water.
16. The method of claim 9, wherein the pH of the treated aldehyde is adjusted by adding an acid salt of an amino acid.

17. The method of claim 16, wherein the acid salt of the amino acid is selected from the group consisting of glycine hydrochloride, glycine bisulfate, histidine monohydrochloride, histidine dihydrochloride, lysine dihydrochloride, lysine sulfate, or any other amino acid hydrochloride and mixtures thereof.

18. The method of claim 9, wherein the pH of the treated aldehyde is adjusted to 9 or lower.

19. The method of claim 1, wherein the aldehyde is neutralized at room temperature.

20. The method of claims 1- 19, wherein the treated aldehyde has a LC₅₀ greater than 500mg/L.

21. A system for neutralizing an α -hydrogen-free aldehyde and making the aldehydes less toxic comprising:

a container;

a source of α -hydrogen-free aldehyde selected from the group consisting of *o*-phthalaldehyde, formaldehyde and mixtures thereof directed to the container; and

a source of a base directed to the container to yield treated aldehydes of lower toxicity than the untreated aldehydes.

22. The system of claim 21, wherein the base comprises at least one hydroxide group.

23. The system of claim 22, wherein the base is selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, lithium

hydroxide, magnesium hydroxide, ferric hydroxide, aluminum hydroxide and mixtures thereof.

24. The system of claim 22, wherein the at least one hydroxide group is produced from a chemical reaction.

25. The system of claim 24, wherein the chemical reaction includes at least one chemical that reacts with water, wherein the at least one chemical is selected from the group consisting of metallic lithium, metallic sodium, metallic potassium, metallic magnesium, metallic calcium, sodium hydride, potassium hydride, magnesium hydride, calcium hydride, lithium hydride, sodium methoxide, sodium ethoxide, potassium methoxide, potassium ethoxide and mixtures thereof.

26. The system of claim 22, wherein the base is sodium hydroxide.

27. The system of claim 26, wherein the molar ratio of sodium hydroxide to *o*-phthalaldehyde is at least about 2.4:1.

28. The system of claim 22 further comprising a source of pH adjusting material to adjust the pH of the treated aldehyde.

29. The system of claim 28, wherein the source of pH adjusting material is an acid.

30. The system of claim 29, wherein the acid is an organic acid or an inorganic acid.

31. The system of claim 30, wherein the organic acid is selected from the group consisting of amino acids, formic acid, acetic acid, propionic acid, butyric acid, benzoic acid, and mixtures thereof.

32. The system of claim 30 wherein the inorganic acid is selected from the group consisting of hydrochloric acid, sulfuric acid, phosphoric acid, potassium dihydrogen phosphate, nitric acid and mixtures thereof.

33. The system of claim 28, wherein the source of pH adjusting material is a buffer.

34. The system of claim 28, wherein the source of pH adjusting material is water.

35. The system of claim 28, wherein the source of pH adjusting material is an acid salt of an amino acid.

36. The system of claim 35, wherein the acid salt of the amino acid is selected from the group consisting of glycine hydrochloride, glycine bisulfate, histidine monohydrochloride, histidine dihydrochloride, lysine dihydrochloride, lysine sulfate, or any other amino acid hydrochloride and mixtures thereof.

37. The system of claim 28, wherein the sources of pH adjusting material added to the container are controlled to achieve the treated aldehyde having the pH 9 or lower.

38. The system of claims 21 to 37, wherein the sources added to the container are controlled to achieve the treated aldehyde having a LC_{50} greater than 500mg/L.